

# STUCCO PRODUCTION WITH ROLLER MILL



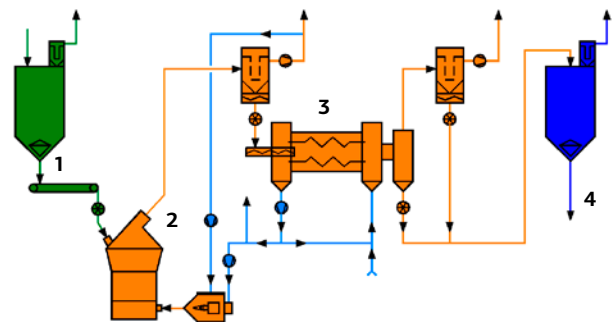
Flash calcining by roller mills is primarily applied in the manufacture of stucco plaster with shorter setting times, used for the fabrication of gypsum building elements such as plasterboards, gypsum fibre boards, plaster blocks and ceiling tiles. The shorter plaster setting time permits a higher production capacity of such plants.

The total investment cost for a roller mill calcining system is lower than for long-time calcining systems, since the process steps of grinding, drying and calcining occur simultaneously (lower space requirement, smaller building dimensions, lower investment costs for the equipment). In the roller mill calcining systems the consumption figures for thermal energy are lower than compared with long-time calcining systems. Roller mills have a greater operational flexibility; the start-up and shut-down periods are shorter compared with long-time calcining systems.

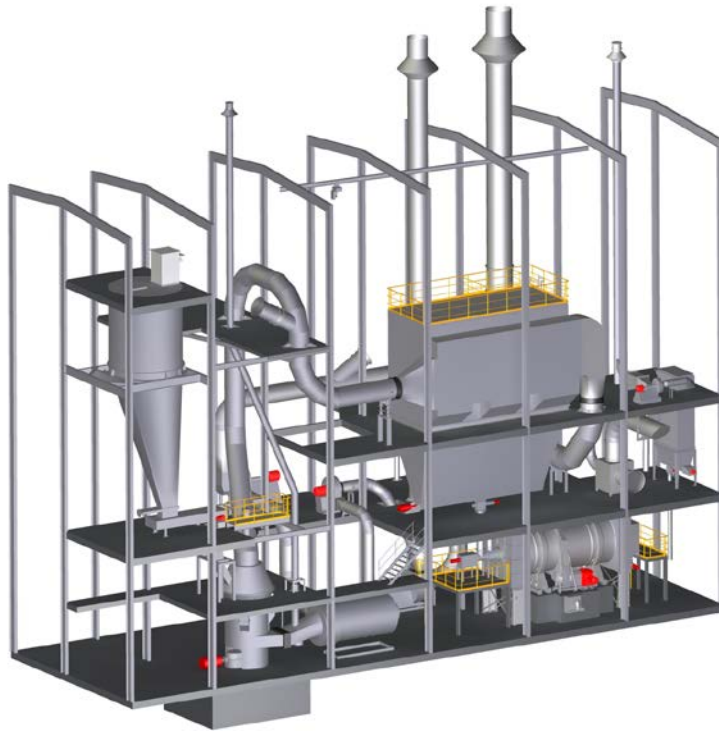
Pre-crushed natural gypsum or mixtures of natural gypsum and FGD gypsum are ground, dried, calcined and classified in the roller mill. A roller mill can accept up to 45% of wet FGD gypsum and 10% of recycled plasterboard in the mixture with natural gypsum. Product characteristics and fineness can be varied within a wide range. A single roller mill installation can provide more than 100 t/h of stucco plaster. The maximum feed size of the natural gypsum is approx. 50 mm.

The pre-crushed raw material is fed to the roller mill via a metering belt. A rotary valve is required to protect the metering belt from high temperatures but also to prevent the calcining system from picking up ambient leakage air. A laterally positioned material inlet provides gypsum feeding to the centre of the grinding table. Three stationary grinding rollers roll on a rotating grinding table. The material is drawn in between grinding rollers and grinding track and ground by pressure and shear. The compression force is generated by a hydropneumatic tensioning system. Start-up is with the rollers lifted so that there is a low starting torque. The grinding rollers are lowered by the hydropneumatic system to an adjustable contact pressure. Metal-to-metal contact is prevented during every phase of the process, resulting in smooth operation.

A combination of a fluidised bed above a lower ring and further contact with the rising process gas provides the heat transfer for calcining the gypsum. The roller mill and a dynamic classifier are combined in a compact unit. In the classifier a rotating separating wheel separates the ground and dried material into fine finished product and grits. The grits fall back into the centre of the grinding zone. The finished calcined product leaves the classifier together with the process gas and is separated in a filter system.



- 1 Material feed system
- 2 Roller Mill for grinding and calcining
- 3 Cooler
- 4 Finished product storage



The hot gases for heating the roller mill are produced in a separate hot gas generator. Heavy oil, light oil and natural gas can be used for fuel. The fuel supply is automatically controlled in accordance with the heat requirement.

For the roller mill calcining system Grenzebach proposes an indirect stucco cooling system with a rotary tubular stucco cooler to suppress uncontrolled calcination of hot material. To maintain constant cooling conditions in the stucco cooler, the cooling air inlet temperature is controlled to counteract variations caused by ambient temperature differences between day and night and winter and summer seasons. Soluble Anhydrite (AIII) is reduced by controlled pick up of vapour as part of the process gas. The required discharge temperatures are controlled by the cooling air flow. The finished stucco plaster is very consistent and homogeneous. Favourable thermal efficiency is achieved by recycling more than 50% of the exhaust gas as well as using preheated cooling air from the cooler as combustion air for the hot gas generator. This recirculation of the exhaust gases creates a certain water vapour content during the calcining process, positively influencing the quality of the final product regarding the Anhydrite-III percentage, the setting times and the yield.

**Particular features of roller mill calcining system:**

- Grinding, drying and calcining in one step
- Three-roller system
- Quiet operation, no vibrations
- Favourable flow conditions
- Dynamic classifier
- High thermal efficiency from recirculation of dust-free flue gas, of exhaust gas and preheated cooling air
- Favourable control behaviour of the calcining process
- Standardised sizes up to an output of 100 tonnes per hour in one unit
- Simple design made of proven and reliable components
- Low electric power consumption
- Maximum availability
- Low investment cost